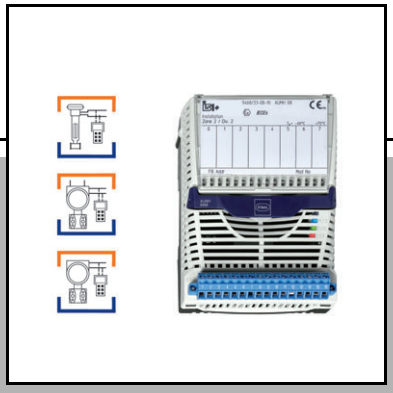

Operating instructions

Analog Universal Module HART for Zone 2

> 9468/33

1 Contents

1 Contents 2
2 General information 2
2.1 Manufacturer 2
2.2 Information regarding the operating instructions 2
2.3 Conformity with standards and regulations 2
3 Symbols used 3
4 General safety notes 3
4.1 Operating instructions storage 3
4.2 Safety notes 3
4.3 Alterations and modifications 4
4.4 Special versions 4
5 Intended use 4
6 Components 5
6.1 Overview 5
6.2 Pluggable terminal X1 5
7 Technical data 6
8 Transport and storage 9
9 Installation 9
9.1 Dimensions / fastening dimensions 9
9.2 Installation conditions 9
9.3 Mounting and operating position 10
9.4 LED indications and troubleshooting 11
9.5 Dismounting / replacement of the module 12
10 Maintenance, overhaul and repair 13
10.1 Maintenance 13
10.2 Repair instructions 13
11 Disposal 13
12 Accessories and spare parts 14
13 EC Declaration of Conformity 15

2 General information

2.1 Manufacturer

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Am Bahnhof 30
74638 Waldenburg
Germany

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Fax: +49 7942 943-4333
Internet: www.stahl-ex.com

2.2 Information regarding the operating instructions

ID-No.: 218080 / 946860310020
Publication code: 2013-01-18·BA00·III·en·00

2.3 Conformity with standards and regulations

Conformity with standards and regulations is specified in the corresponding certificates and the EC Declaration of Conformity. These documents can be downloaded from our homepage www.stahl-ex.com.

3 Symbols used

	Safety notes **Non-compliance can result in material damage, serious injuries or death.** The safety notes contained in these operating instructions and affixed to the device must be observed!
	Warning symbol Danger due to explosive atmosphere!
	Warning symbol Danger due to live components!
☞	**Note** This graphic marks important additional information, tips and recommendations.

4 General safety notes

4.1 Operating instructions storage

Read these operating instructions carefully and store them near the installation place. For correct operation, please observe all other documents enclosed in this delivery and the operating instructions of the equipment to be connected.

4.2 Safety notes

⚠ WARNING	
	Use the devices only for their intended purpose! ▶ We cannot be held liable for damage caused by incorrect or unauthorized use or by non-compliance with these operating instructions. ▶ Use the device only if it is undamaged and clean.

⚠ WARNING	
	Any unauthorized work on the device is prohibited! Installation, maintenance, overhaul and repair may only be carried out by authorized and appropriately trained personnel.

Observe the following information during installation and operation:

- ▶ Any damage can invalidate the explosion protection
- ▶ National and local safety regulations
- ▶ National and local accident prevention regulations
- ▶ National and local assembly and installation regulations
- ▶ Generally recognized technical regulations
- ▶ Safety notes in these operating instructions
- ▶ Characteristic values and rated operating conditions on the rating plates and data plates
- ▶ Additional information plates on the devices

Additional safety notes:

- The analog universal module HART Type 9468/33 is approved for use in gas hazardous areas of Zone 2 and in the safe area.
- The analog universal module HART Type 9468/33 is approved for use in dust hazardous areas of Zone 21 and Zone 22.
- For operation in gas or dust hazardous areas, the module must be installed in an enclosure which fulfills the requirements of IEC/EN 60079-0.
- The module must be mounted on the BusRail 9494 only.
- A distance of 50 mm must be maintained between intrinsically safe and non-intrinsically safe electric circuits.
- Modules with intrinsically safe and non-intrinsically safe field circuits may be operated simultaneously on one BusRail. In this case, a distance of 50 mm must be maintained between the terminals of intrinsically safe and non-intrinsically safe electric circuits (e.g. partition 220101 or empty space).
- The safety-related maximum values of the connected field devices must match the values of the modules according to data sheet, operating instructions or EC type examination certificate.
- Interconnections of several active intrinsically safe circuits can result in different safety-related maximum values. This can endanger the intrinsic safety so that an appropriate proof must be provided.
- Modules and plug connectors may be connected and disconnected during operation in hazardous areas (hot-swap und hot-plug).
- To avoid electrostatic charging, the modules in hazardous areas must be cleaned only with a moist cloth.

4.3 Alterations and modifications

⚠ WARNING	
	Alterations and modifications to the device are not permitted. We shall not accept any liability or warranty obligations for damage resulting from alterations and modifications.

4.4 Special versions

In case of additional/different order options, special versions may differ from the description given here.

5 Intended use

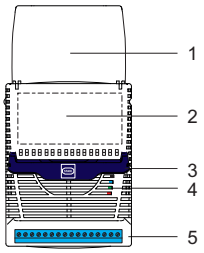
The analog universal module HART is used for connecting of up to 8 intrinsically safe analog standard signals 0/4 … 20 mA to the IS1 remote I/O system. The digital communication with connected field devices can take place bidirectionally via the HART protocol. Each channel can be parameterised as input for connecting 2-wire transmitters including transmitter supply or as output for connecting positioners or indicators. The Ex i inputs and outputs are short-circuit proof and galvanically separated from the system.

Compatible spare for IS1 I/O modules:
Series 9460/12*), 9461/12 *), 9465/12 and 9466/12

*) for operation with active 4-wire HART transmitters, a 9164 is additionally required for each channel

6 Components

6.1 Overview



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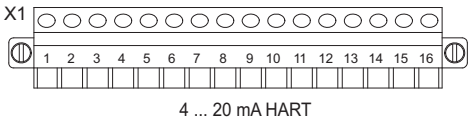
1	Operating flap with insert label (open) and connection diagram
2	Module data (serial number, hardware revision number, software revision number, manufacturing date, e.g.: 123456DE9999 Rev.A 01-01 0508)
3	Notch lever for removing the module from the BusRail
4	LED for operation indication ("RUN", green), error ("ERR", red) and maintenance ("M/S", blue) (for further information, see "LED indications and troubleshooting")
5	Pluggable terminal X1 with two safety screws

6.2 Pluggable terminal X1

For the module, a pluggable terminal X1 (screw-type terminal 162702 or spring clamp terminal 162695) for connection of field devices is available as accessory (not included in the scope of delivery of the module!).
The pluggable terminal X1 has 16 terminals for connection of the field cables.



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Terminal assignment

	X1 2-wire input/output with HART	X1 3-wire input with HART	X1 4-wire input
Channel	Terminals	Terminals	Terminals
0	1(+), 2(-)	supply 1(+), signal 2(+), common 4(-)	2(+), 4(-)
1	3(+), 4(-)	--	--
2	5(+), 6(-)	supply 5(+), signal 6(+), common 8(-)	6(+), 8(-)
3	7(+), 8(-)	--	--
4	9(+), 10(-)	supply 9(+), signal 10(+), common 12(-)	10(+), 12(-)
5	11(+), 12(-)	--	--
6	13(+), 14(-)	supply 13(+), signal 14(+), common 16(-)	14(+), 16(-)
7	15(+), 16(-)	--	--

NOTICE	
☞	The channels have no common connection to earth among themselves.

NOTICE	
☞	Mixed operation of 2-wire / 3-wire / 4-wire is permissible. In case of 3- and 4-wire operation, each following channel (1, 3, 5, 7) must be used for common connection.

In case of 4-wire operation, the following information and restrictions apply:

Only for connection of maximum 4 galvanically separated, unearthed intrinsically safe field circuits. HART-communication is not supported.
For use of earthed field circuits and/or HART communication, a device Type 9164 is required for each 2-wire channel.
Safety-related limiting values: U_o, I_o, P_o, C_i and L_i are negligible.
Maximum connectable safety characteristic values during operation with active 4-wire transmitters:

Max. input voltage U_i [V]	Max. input current I_i [mA]	Max. ambient temperature T_{amb} [°C]
28	150	55
28	140	60
28	130	65
28	115	70
28	105	75

7 Technical data

Explosion protection									
Global (IECEx)									
Gas and dust	IECEx DEK 12.0054X Ex nA ia [ia Ga] IIC T4 Gc [Ex ia Da] IIIC								
Europe (ATEX)									
Gas and dust	DEKRA 12 ATEX0173 X Ⓔx II 3 (1) G Ex nA ia [ia Ga] IIC T4 Gc Ⓔx II (1) D [Ex ia Da] IIIC								
USA (FM)	in preparation								
Certificates and approvals									
Certificates	IECEx, ATEX								
Further parameters									
Installation	in Zone 2, Zone 21, Zone 22 and in the safe area								
Safety data									
Max. voltage U_o	24.4 V								
2-wire input/output									
Max. current I_o	80 mA								
Max. power P_o	488 mW								
Max. connectable inductance L_o/capacity C_o									
IIC	L_o [mH]	3.8	2	1	0.5	0.2			
	C_o [nF]	53	59	71	88	119			
IIB	L_o [mH]	23	10	2	1	0.5	0.2	0.1	0.05
	C_o [nF]	370	430	430	470	550	700	860	890
3-wire input									
Max. current I_o	81.8 mA								
Max. power P_o	499 mW								
Max. connectable inductance L_o/capacity C_o									
IIC	L_o [mH]	3.6	2	1	0.5	0.2			
	C_o [nF]	53	58	70	87	119			
IIB	L_o [mH]	21	10	2	1	0.5	0.2	0.1	0.05
	C_o [nF]	380	420	420	470	550	700	860	890
Max. internal capacity C_i	negligible								
Max. internal inductance L_i	negligible								

Electrical data

Ex i inputs/outputs	
Number of channels	8 (each with adjustable parameters as input or output)
Supply voltage for 2-wire transmitter	16 V (at 20 mA)
Nominal signal range	0 … 20 mA / 4 … 20 mA
Digital communication	HART protocol
Min. signal	0 mA
Max. signal	
For inputs	23.5 mA
For outputs	22.8 mA (4 ... 20 mA) / 23.5 mA (0 ... 20 mA)

Signal transmission

	Filter time constant (adjustable parameters)		
	small	medium	50 Hz, 60 Hz
Resolution in the range 4 ... 20 mA	14.75 bit (with HART: 12.75 bit)	14.75 bit	14.75 bit
Maximum delay from signal / internal bus	32 ms	120 ms	500 ms

Transient response output (10...90 %)	40 ms
Max. short-circuit current	
For inputs	24 mA
For outputs	22.8 mA (4 ... 20 mA) / 23.5 mA (0 ... 20 mA)
Max. input resistance for each channel	14.1 Ω
Max. load resistance (output)	750 Ω at 20 mA 700 Ω at 21.8 mA
Galvanic separation	
Test voltage	
acc. to standard	EN 60079-11
Between auxiliary power/ system components	≥ 1500 V AC
Between two I/O modules	≥ 500 V AC
Between I/O channels/ system components	≥ 500 V AC
Between I/O channels/ ground (PA)	≥ 500 V AC
Electromagnetic compatibility	Tested to the following standards and regulations: EN 61326-1 (2006) IEC 61000-4-1 … 6, NAMUR NE 21
Electrical connection	
Power supply	BusRail Types 9494
Ex i field signals	Pluggable, blue terminals, 16-pole, 2.5 mm^2, screw- or spring-type versions with lock
Auxiliary power	
Version	Intrinsically safe Ex ia via IS1+ BusRail
Max. current consumption	220 mA (at 20 mA per channel)
Max. power consumption	5.3 W (at 20 mA per channel)
Max. power dissipation	
Only outputs	3.7 W (at 20 mA, 500 Ω per channel)
Only inputs	2.7 W (at 20 mA per channel)

Device-specific data	
Settings	
Module	
Diagnostics message	ON / OFF
Signal filter	small / medium / big 50 Hz / large 60 Hz
Scan HART live list	ON / OFF
Signal	
Signal type	Input / output
Signal range	0 … 20 mA / 4 … 20 mA
Measuring range input	2.4 … 22.8 or 23.5 mA / 3.6 … 21 mA (acc. to NAMUR)
Line fault monitoring	ON / OFF
Behaviour in case of error	Input: -10 %, 0 %, 100 %, 110 %, alarm code, hold last value Output: -10 %, 0 %, 100 %, 110 %, hold last value
Cyclic transmission of HART variables	no / 4 HV / 8 HV

Accuracy of measurement	Error of measurement with filter time constant	small	medium	50 Hz, 60 Hz
	Maximum error of measurement	0.075 % (12 µA at 4 … 20 mA)	0.05 % (8 µA at 4 … 20 mA)	0.05 % (8 µA at 4 … 20 mA)

Ambient temperature influence	< 0.03 % / 10 K
Note	All values in % of the signal span at 23 °C
Ambient conditions	
Ambient temperature	-40 … +75 °C
Storage temperature	-40 … +80 °C
Maximum relative humidity	95 % (without condensation)
Semi-sinusoidal shock (IEC EN 60068-2-27)	15 g (3 shocks per axis and direction)
Sinusoidal vibration (IEC EN 60068-2-6)	1 g in the frequency range 10 ... 500 Hz 2 g in the frequency range 45 ... 100 Hz
Mechanical data	
Degree of protection (IEC 60529)	IP20
Module enclosure	polyamide 6GF
Fire resistance (UL 94)	V2
Pollutant class	corresponds to G3
Dimensions	L = 128 mm, W = 96.5 mm, H = 67 mm
Indication	
LED indication	
Module requires maintenance	LED "M/S", blue
Operating state	LED "RUN", green
Group error	LED "ERR", red
Function indication	
Retrievable parameters	Manufacturer, Type, hardware revision, software revision, serial number
Error indication	
Module status and alarms	• Internal bus error primer / redundant • No response from IOM • Configuration does not correspond to the module • Hardware error • Excess temperature • Slot error • Module requires maintenance
Signal errors for each channel	
Signal status bit	"0" = signal disturbed; "1" = signal valid
Wire breakage input	< 2.4 mA / < 3.6 mA (adjustable parameters, at 4 … 20 mA)
Short circuit input	> 23.5 mA or > 22.8 mA / > 21 mA (adjustable parameters)
Wire breakage output	Terminal voltage > 16 V (response range 16 ... 16.5 V) or output current can no longer be set
Short circuit output	Output load < 60 Ω (response range 40 ... 60 Ω)
Mounting / installation	
Mounting orientation	horizontal or vertical
Mounting type	on 35 mm DIN rail NS 35/15 (DIN EN 60715)

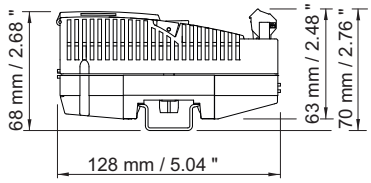
8 Transport and storage

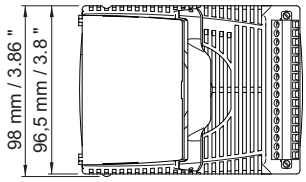
- ▶ Transport and storage are only permitted in the original packaging.
- ▶ The devices must be stored in a dry place and vibration-free.

9 Installation

9.1 Dimensions / fastening dimensions

Dimensional drawings (all dimensions in mm / inches) - subject to modifications





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9.2 Installation conditions

⚠ WARNING	
	The national installation instructions (e.g. IEC/EN 60079-14) must be observed. Ensure that there is a distance of at least 50 mm (safety distance) between connecting units of intrinsically safe and non-intrinsically safe circuits!

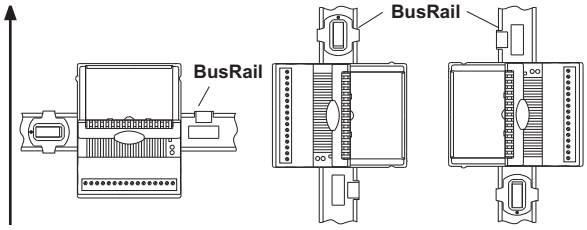
⚠ WARNING	
	If the installation has strong electromagnetic sources of interference, use of shielded field cables is recommended. In this case, the shield must be connected to the equipotential bonding of the hazardous area! For this purpose, the shields of the field wiring must be connected to the shield busses installed in the enclosure as close to the entry point as possible! The shield busses must be also connected to the mounting plate close to the entry point of the field wiring using the shortest possible way!

9.3 Mounting and operating position

Mounting the module on BusRail

NOTICE	
☞	The module and pluggable terminal X1 can be safely connected or disconnected during operation in a hazardous area (hot swap).

NOTICE	
☞	Module operation is permitted only in the following mounting positions: Vertical mounting with pluggable terminal below, on the left or right.



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- ▶ Position the module vertically on the provided slot of the BusRail
- ▶ Snap module into place by slightly pressing it

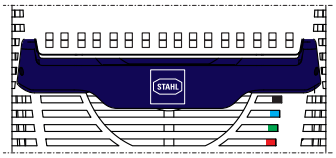
Connecting field devices to the module

NOTICE	
☞	The mounting can be carried out with connected or disconnected terminal. In the operating flap, there is a insert label which can be used to enter the assignment of the field devices to the channels. Labelling of the insert label can be performed, for example by means of the IS Wizard.

- ▶ Connect field devices to terminal X1 according to terminal assignment (see on the front or on insert label under the operating flap) (tightening torque for screw-type terminals 0.5 ... 0.6 Nm)
- ▶ Place the field wiring shields (if present) as close to the entry point on the grounding rail as possible
- ▶ Plug the pluggable terminal X1 into the module and secure it against loosening using safety screws (tightening torque 0.5 ... 0.6 Nm)
- ▶ Mount partition if necessary (distance between intrinsically safe and non-intrinsically safe electric circuits at least 50 mm)

9.4 LED indications and troubleshooting

Meaning of the LEDs



15395E00

- LED "RUN", green = operation indication
- LED "ERR", red = module error indication
- LED "M/S", blue = requires maintenance or outside specification

Indication overview

	Module state	Error source	Possible solution
LED "RUN", green			
ON	Normal operation	--	--
FLASHES	In standby (switched on but no data exchange with master yet)	The module is in proper condition but is not ready for cyclic data exchange yet (there is no parameter set available yet). Outputs in a state without power.	• Activate the cyclic data transfer with the master • Check master, bus connection and CPM
OFF	No function	No supply voltage at the I/O module or I/O module is defective.	• Check system supply • Check CPM or CPU&PM • Check the BusRail • Engage the I/O module correctly on the BusRail • Replace the I/O module
LED "ERR", red			
OFF	No error	--	--
FLASHES	External error	Error in the field circuit: wire breakage, short circuit, measuring range exceeded/ not reached	• Eliminate the cause in the indicated field circuit, check electric lines and field device
	Incorrectly configured module	Configuration is not correct or a wrong module is connected	• Change configuration in the automation system or connect the right module
	Outputs in safety position	Cyclic data transfer with the automation system has been interrupted	• Check the cyclic data transfer of CPM or CPU (LCD or LED "RUN") • Check bus connection • Activate the cyclic data transfer with the automation system
ON	Module error	Module is defective	• Replace the module
LED "M/S", blue			
OFF	Normal operation	--	--
FLASHES	External maintenance required	Ambient temperature is outside the specification	• Reduce ambient temperature by means of, e.g. shading or cooling **Note: If the problem is not eliminated, the module will be permanently damaged**
ON	Maintenance required	Slot error or module is damaged by excess temperature or end of the service life reached	• Replace the module as soon as possible within the next 12 months, otherwise there is a risk of module failure

9.5 Dismounting / replacement of the module

⚠ WARNING
If a partition is mounted, first pull out terminal X1 from the module to be replaced.

NOTICE
☞ When replacing the module by a module identical in construction, the set parameters are maintained. No further user adjustments are necessary. When replacing the module by a module with a different function, the module reports a configuration error (red LED "ERR" flashes). The module must be either re-parameterised or it is necessary to connect a module of the right type.

NOTICE
☞ If an IS1 module is replaced by an IS1+ module with the same functions, the IS1+ module functions in the compatibility mode (= identical functionality). If new IS1+ functions must be used, it may be necessary to update the software of CPM 9440 or CPU 9441. In case of PROFIBUS DP operation, a new GSD may be required. If required, contact your responsible distributor for further information.

- ▶ Loosen safety screws of the pluggable terminal X1
- ▶ Pull out the terminal from the module
- ▶ If required, remove the partition
- ▶ Pull the blue notch lever of the module upwards to unlock the module
- ▶ Remove the module vertically from the BusRail
- ▶ Position the new module vertically onto the BusRail and snap into place by slightly pressing it
- ▶ If required, snap partition into place between modules
- ▶ Plug the pluggable terminal X1 into the module and secure it against loosening (tightening torque 0.5 ... 0.6 Nm)

10 Maintenance, overhaul and repair

10.1 Maintenance

The module does not require regular maintenance.

- ▶ Observe the function according to intended use
- ▶ Follow the directives according to IEC/EN 60079-17
- ▶ Adhere to permissible temperatures according to IEC/EN 60079-0

NOTICE	
☞	If the blue LED "M/S" lights up continuously, it is recommended to replace the module in the foreseeable future. Otherwise there is a high probability that the module will fail in 12 months (see "LED indications and troubleshooting").

10.2 Repair instructions

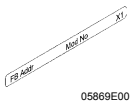
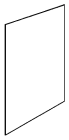
NOTICE	
☞	Repair must be performed by the manufacturer only! When repair is required, send the module to your responsible sales organization (for the address, see chapter 2.1).

11 Disposal

- ▶ Observe the national waste disposal regulations.

12 Accessories and spare parts

⚠ WARNING	
	Explosion hazard due to wrong or insufficient spare parts or wrong accessories! For components with relevant Ex protection, use only suitable, certified spare parts or corresponding accessories of R. STAHL Schaltgeräte GmbH or other manufacturers. Otherwise, explosion protection cannot be guaranteed any longer. R. STAHL Schaltgeräte GmbH cannot be held liable for damage caused by ignoring this danger.

Designation	Figure	Description	Art. no.	Weight kg
Plug-in terminal	02079E00	2.5 mm^2 with lock, 16-pole, screw connector, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits Labelling: 1 ... 16	162702	0.028
	02077E00	2.5 mm^2 with lock, 16-pole, spring clamp connection, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits, incl. test jacks Labelling: 1 ... 16	162695	0.028
mA - Isolating Repeater	10389E00	The mA isolating repeaters are used for the connection of 4-wire transmitters to active 2-wire inputs and for the galvanic separation. Input: sink, Ex e Output: sink, Ex i	160166	0.107
	04653E00	The mA isolating repeaters are used for the connection of 4-wire transmitters to active 2-wire inputs and for the galvanic separation. Input: sink, Ex i Output: sink, Ex i	160165	0.075
Labelling strips	 05869E00	"FB Addr ... Mod No ..." for pluggable terminal, sheet with 26 strips	162788	0.001
DIN A4 sheet	 09900E00	For label plate on I/O modules; 6 labels on each sheet; print-out using IS Wizard; packaging unit = 20 sheets	162832	0.001
Partition	15196E00	For mounting between intrinsically safe and non-intrinsically safe connections of the I/O modules, in order to adhere to the required 50 mm distance	220101	0.000
Warning sign	05872E00	"Clean modules only with a damp cloth."	162796	0.001

13 EC Declaration of Conformity

EG-Konformitätserklärung
EC Declaration of Conformity
Déclaration de Conformité CE

R. STAHL Schaltgeräte GmbH • Am Bahnhof 30 • 74638 Waldenburg, Germany
erklärt in alleiniger Verantwortung, *declares in its sole responsibility, déclare sous sa seule responsabilité,*

dass das Produkt: *that the product:* *que le produit:*	**Analog Universal Modul HART** *Analog Universal Module HART* *Module analogique universel HART*
Typ(en), *type(s), type(s):*	**9468/3b-08-1f (b = 2, 3 ; f = 0, 1)**

mit den Anforderungen der folgenden Richtlinien und Normen übereinstimmt.
is in conformity with the requirements of the following directives and standards.
est conforme aux exigences des directives et des normes suivantes.

Richtlinie(n) *Directive(s)* *Directive(s)*	**Norm(en)** *Standard(s)* *Norme(s)*
94/9/EG: ATEX-Richtlinie *94/9/EC: ATEX Directive* *94/9/CE: Directive ATEX*	EN 60079-0: 2012 EN 60079-11: 2012 EN 60079-15: 2010
Kennzeichnung für, *marking for, marquage pour:* **9468/32-08-1***	**II 2 (1) G Ex ia [ia Ga] IIC T4 Gb** **II (1) D [Ex ia Da] IIIC** **CE 0158**
Kennzeichnung für, *marking for, marquage pour:* **9468/33-08-1***	**II 3 (1) G Ex nA ia [ia Ga] IIC T4 Gc** **II (1) D [Ex ia Da] IIIC** **CE 0158**
EG-Baumusterprüfbescheinigung: *EC Type Examination Certificate:* *Attestation d'examen CE de type:*	**DEKRA 12 ATEX 0173 X** (DEKRA Certification B.V., Utrechtseweg 310, 6812 AR Arnhem, The Netherlands)
2004/108/EG: EMV-Richtlinie *2004/108/EC: EMC Directive* *2004/108/CE: Directive CEM*	EN 61326-1: 2006
Sonstige Normen: *Other Standards:* *Autres normes:*	EN 50178: 1997 EN 61010-1: 2010

Waldenburg, 07.02.2013 — **Ort und Datum** *Place and date* *Lieu et date*

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F-4174-601 01/2011 STMZ

9468 6 002 001 0_00

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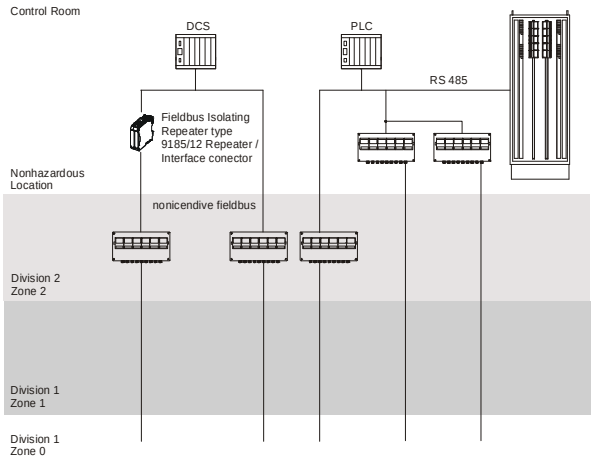
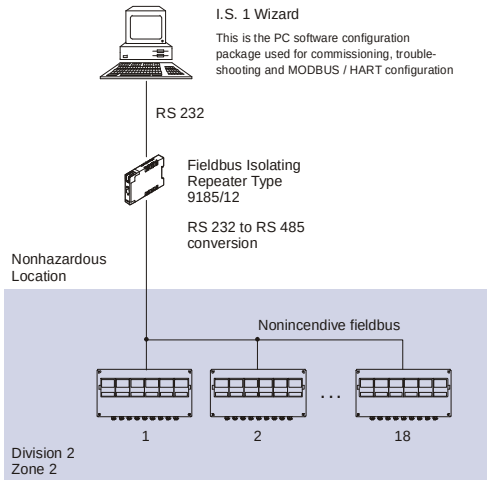
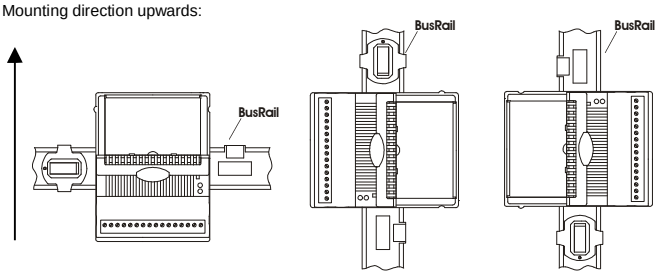


Example: System Topology interfacing Automation control systems with DIV 2 / Zone 2 Installation of IS1 resp. IS1+ Remote I/O System



Service Bus with Isolating Repeater interface

Mounting direction upwards:



The IS1 resp. IS1+ Remote I/O is a DIN rail mounted system designed to record and output process control signals between hazardous location transducers and sensors and a nonhazardous location automation system. It consists of electrical apparatus in the nonhazardous, Class I, Division 2 or Class I, Zone 2 hazardous locations linked by either nonincendive field bus or a field bus installed per the National Electrical Code, ANSI/NFPA 70 Article 500.

The nonincendive field bus circuit is achieved with the use of the Fieldbus Isolating repeater type 9185. This device resides in the nonhazardous location and provides a nonincendive field bus circuit for connection to the IS1 resp. IS1+ Remote I/O System. See example to the left.

The apparatus located in the Division 2 or Zone 2 hazardous location are referred to as Remote I/O, and consist of the following major subsystems.

1. <u>CPU & Power Module or CPU Module, Power Module & Socket</u>
   The CPU & Power Module or the Power Module serves as a power supply unit for its CPU unit or the CPU Module, as well as for the supply to the I/O Modules and the field circuits. The power supply to the I/O modules is implemented via the BusRail. For the configuration with a redundant CPU and Power Module the power supply to the I/O modules is decoupled with diodes. The power supply unit has an under voltage monitoring circuit. The CPU fulfils the function of a gateway between the internal bus of an IS1 field station and the fieldbus which connects the field station with the automation system. The gateway is constructed as a dual processor system. The I/O processor controls the data exchange with the I/O modules and, when plugged-in, with the redundant CPU & Power Module. The communication processor controls the data exchange on the fieldbus and on the Service Bus.

2. <u>BusRail</u>
   The BusRail provides a Power bus, an internal data bus and the address lines for the interconnection of the CPU & Power Supply to Remote I/O modules The Power bus distributes power supplied by the CPU & Power Module to the I/O Modules plugged to the BusRail. The communication with the I/O Modules is implemented via the address and date bus lines. The interface of the CPU & Power Module with the internal data bus on the BusRail is designed with redundancy.

3. <u>Components of Remote I/O System</u>
   All I/O Modules are manufactured in a unique DIN rail mount package which then mounts onto the Remote I/O system BusRail. All I/O Modules provide galvanic isolation between the field circuits and the BusRail's circuits.

4. Refer to pages 3 through 26 for information specific to each module.

GENERAL NOTES:

1. Installation should be in accordance with Article 504/505 of the National Electrical Code, ANSI/NFPA 70 and ANSI/ISA RP12.06.01 resp. with the Canadian Electrical Code, Part I.
2. Use a general purpose enclosure meeting the requirements of ANSI/ISA S82 for use in nonhazardous or Class I, Division 2 hazardous (Classified) Locations.
3. Use an FMRC Approved or NRTL listed Dust-ignition proof enclosure appropriate for environment protection in Class II, Division 1, Groups E, F and G; and Class III, hazardous (Classified) Locations.
4. All I/O Modules may be detached from the BusRail or plugged onto it during operation in hazardous areas.
5. The Modules may be operated in one of the three mounting positions only.

F 4830 503 G

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The safety relevant statements of this document may be transferred into the operating instructions.
Transferring the text, editorial changes of equivalent meaning are allowed.

			2013	Date	Name	Certification drawing	Scale: none
			drawn	08.02.	Reistle	**IS1 resp. IS1+ Remote I/O System for CL I, DIV 2 / Zone 2 Overview**	
			checked		Kaiser		Sheet: 1 of 30
02	26.02.2014	Bagusch				9400 6 031 002 1	Agency: FM
01	17.02.2014	Bagusch					
Version	Date	Name				Ers. f. / Ers. d.	A4

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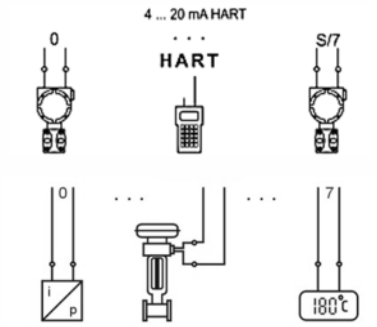
Nonhazardous
Class I, II, III, Division 2, Group A-G
or Class I, Zone 2, Group IIC/IIB
Hazardous (Classified) Locations



FM approved i/p converters, positioners, indicators

Wiring legend
Connection allocation – Analog Universal Module HART Type 9468

Channel	X1 / 2-Wire Input/Output Terminals	X1 / 3-Wire Input Terminals	X1 / 4-Wire Input Terminals
0	1(+), 2(-)	supply 1(+) signal 2(+) common 4(-)	2(+), 4(-)
1	3(+), 4(-)		
2	5(+), 6(-)	supply 5(+) signal 6(+) common 8(-)	6(+), 7(-)
3	7(+), 8(-)		
4	9(+), 10(-)	supply 9(+) signal 10(+) common 12(-)	2(+), 4(-)
5	11(+), 12(-)		
6	13(+), 14(-)	supply 13(+) signal 14(+) common 16(-)	2(+), 4(-)
7	15(+), 16(-)		

WARNING: Substitution of components may impair Intrinsic Safety.
AVERTISSEMENT: Substitution de composants peut compromettre la sécurité intrinsèque.

The Type 9468 Analog Universal Module HART is designed to receive a digital output from the IS1 CPU & Power Module and output a corresponding analog signal to positioners, loop distance, etc.. It is also designed to input analog signals from a hazardous location transmitter and output a representative digital signal for processing by the IS1 CPU & Power Module. The module is nonincendive for installation in a Class I, II, III, Division 2, Group A-G or Class I, Zone 2, Group IIC/IIB hazardous location according to NEC Article 504/505 and provides intrinsically safe connections for the hazardous locations listed below.

Entity parameters for wiring configuration to the left are as follows:

2-Wire input/output circuits
V_{OC} = 24.4 V
I_{SC} = 80 mA
P_O = 488 mW

CL I, DIV 1, A,B / Zone 0, GP IIC		CL I, DIV 1, C-G / Zone 0, GP IIB/IIIC	
La [mH]	Ca [nF]	La [mH]	Ca [nF]
3.8	53	23.0	370
2.0	59	10.0	430
1.0	71	2.0	430
0.5	88	1.0	470
≤ 0.2	119	0.5	550
		0.2	700
		0.1	860
		≤ 0.05	890

3-Wire input/output circuits
V_{OC} = 24.4 V
I_{SC} = 81.8 mA
P_O = 499 mW

CL I, DIV 1, A,B / Zone 0, GP IIC		CL I, DIV 1, C-G / Zone 0, GP IIB/IIIC	
La [mH]	Ca [nF]	La [mH]	Ca [nF]
3.6	53	21.0	380
2.0	58	10.0	420
1.0	70	2.0	420
0.5	87	1.0	470
≤ 0.2	119	0.5	550
		0.2	700
		0.1	860
		≤ 0.05	890

4-Wire input/output circuits
V_{OC} = negligibility
I_{SC} = negligibility
P_O = negligibility

Vi = 28.0 V
Ci = negligibility
Li = negligibility
Ii = 150 mA at T_{amb} ≤ 55°C
Ii = 140 mA at T_{amb} ≤ 60°C
Ii = 130 mA at T_{amb} ≤ 65°C
Ii = 115 mA at T_{amb} ≤ 70°C
Ii = 105 mA at T_{amb} ≤ 75°C

Notes:

1. Intrinsically safe apparatus shall be an FM approved System or Entity device connected in accordance with the manufacturer´s installation instructions.
2. For Entity concept use the appropriate parameters from above to ensure the following:
   V_{OC} or $V_t \leq V_{max}$ $C_a \geq C_i + C_{leads}$
   I_{SC} or $I_t \leq I_{max}$ $L_a \geq L_i + L_{leads}$
3. Suitable separation must be maintained between wiring of each I.S. input channel.
4. Suitable separation must be maintained between non I.S. / AEx nA wiring of the input circuits and I.S. wiring of other I/O modules and of the IS1 resp. IS1+ system. Use partition (SAP No. 220101) for separation from I/O modules with I.S. circuits. Do not carry out work at the terminals without the partition plate in place.
5. General Notes (see Page 1)

The safety relevant statements of this document may be transferred into the operating instructions.
Transferring the text, editorial changes of equivalent meaning are allowed.

			2013	Date	Name	Certification drawing	Scale
			drawn	08.02.	Reistle	**Analog Universal Module HART Type 9468/3b-08-1* (b = 2 or 3)**	none
			checked		Kaiser		Sheet 13 of 30
					STAHL	9400 6 031 002 1	Agency FM
02	26.02.2014	Bagusch					
01	17.02.2014	Bagusch					
Version	Date	Name				Ers. f. / Ers. d.	A4

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